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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,197	07/11/2003	Taketo Tsukioka	IPO-P1753	4263

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EXAMINER	
SELBY, GEVELL V	

ART UNIT	PAPER NUMBER
2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/618,197	TSUKIOKA, TAKETO	
	Examiner	Art Unit	
	Gevell Selby	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/11/08 has been entered.

Response to Arguments

2. Applicant's arguments, see the amendment, filed 1/11/08, with respect to the rejection(s) of claim(s) 5-20 under 35 U.S.C. 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sasai, US 6,654,492.

3. Applicant's arguments filed 1/11/08 have been fully considered but they are not persuasive. The applicant submits the prior art does not disclose the following limitations of the claimed invention:

> calculating parameters to be used in a function for estimating the color component non-existent in the pixel of interest from one kind of color component obtained in the pixel of interest, near the pixel of interest, using two kinds if color components: the same color component as the color component non-existent in the pixel of interest; and a same color component as the color component obtained in the pixel of interest, and estimating the color component non-existent in the pixel of interest by said function using the

parameters and a color component obtained in the pixel of interest, as stated in claims 5, 7, 9, 11, and 12. The Examiner respectfully disagrees.

Examiner's Reply:

Re claims 5, 7, 9, 11 and 12) The Kakarala reference discloses calculating parameters (gradients) to be used in a function (see equation 13: interpolated green component at R1) for estimating the color component non-existent in the pixel of interest (Green component at R_1) from one kind of color component obtained in the pixel of interest, near the pixel of interest, using two kinds if color components: the same color component as the color component non-existent in the pixel of interest (Green); and a same color component as the color component obtained in the pixel of interest (Red) (see para. 35, 54, and 83-87), and estimating a color component non-existent in the pixel of interest by said function using the parameters and a color component obtained in the pixel of interest (see para. 62-64 and 88-92: the interpolated green component at R_1 is estimated using the gradients of the neighboring red or blue components). The applicant submits that the present invention differs from the prior art, because the prior art uses all the color components of the neighboring pixels to estimate the missing pixel; however, the claim does not state that only one different color components of the neighboring pixels is used in the estimation. Therefore, the prior art discloses all the limitations of the claim, since a different color component along with other color components of the neighboring pixels are used the estimate the missing color component of the pixel.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakarala et al., US 2003/0052981, in view of Sasai, US 6,654,492.

In regard to claims 5, 9, and 12, Kakarala et al., US 2003/0052981, discloses an image processing device and image processing program comprising:

input circuit (see figure 1, element 20) for inputting an digital image wherein one or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system (see para. 29);

combination average calculation circuit (see figure 1, element 40) for combining two or more pixels from a plurality of pixels having the same color component near the pixel of interest (see para. 44: neighboring pixels are averaged);

color correlation calculation circuit (see figure 4, element 42) for calculating parameters (gradients) to be used in a function (see equation 13: function for calculating the interpolated green component at R1) for estimating the color component non-existent in the pixel of interest (Green component at R_1)

from one kind of color component obtained in the pixel of interest, near the pixel of interest, using two kinds if color components: the same color component as the color component non-existent in the pixel of interest (Green); and a same color component as the color component obtained in the pixel of interest (Red) (see para. 35, 54, and 83-87), and estimating a color component non-existent in the pixel of interest by said function using the parameters and a color component obtained in the pixel of interest (see para. 62-64 and 88-92: the interpolated green component at R_1 is estimated using the gradients of the neighboring red and blue components); and

combination selection circuit (see figure 4, element 40) for selecting one of the plurality of combination averages calculated by the combination average calculation means, as the non-existent color component for the pixel of interest, based upon the color component estimated by the color correlation calculation processing (see para 74-79).

The Kakarala reference does not specifically disclose combining two or more pixels, from a plurality of pixels having the same color component as a color component non-existent in a pixel of interest within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest.

Sasai, US 6,654,492, discloses a an image processing apparatus with an interpolation circuit (see figure 1) for combining two or more pixels, from a plurality of

pixels having the same color component as a color component non-existent (Green or Blue) in a pixel of interest (R pixel) within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest (see figure 3A-4C and column 4, lines 10-65: the neighboring blue pixels are averaged and neighboring Green pixels are averaged).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Kakarala et al., US 2003/0052981, in view of Sasai, US 6,654,492, to have the combination average calculation circuit combining two or more pixels, from a plurality of pixels having the same color component as a color component non-existent in a pixel of interest within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest, in order to obtain a high-quality, small-size image at a high speed without requiring a large number of processes or high power consumption.

In regard to claims 6, 10, and 13, Kakarala et al., US 2003/0052981, discloses the image processing device and image processing program according to claims 5, 9, and 12 wherein the combination average calculation means further calculates the fluctuation of the color component within the combination of two or more pixels (see para. 72-73: the fluctuation of the color component in the neighborhood vote data is considered); and

wherein the color correlation calculation circuit further calculates the reliability of the calculated parameters (see para. 66-71: the adaptive interpolation logic 42 or color

correlation calculation circuit calculates the reliability of the majority rule of the value of α determined by the Jacobian or calculated parameters using the column vote logic); and

wherein, in the event that the reliability calculated is high, the color correlation calculation circuit selects one of the plurality of combination average calculated by the combination average calculation circuit as the non-existent color component for the pixel of interest, based on the color component estimated by the color correlation calculation circuit (see para. 68-71: when the reliability is high or if the horizontal or vertical interpolated component has the most votes then, the component with the most votes is selected), and

in the event that the reliability is low, the combination selection means selects the combination average corresponding to the combination wherein the fluctuation of the color component calculated by the combination average calculation means is the least, as the non-existent color component (see para. 75-76: less fluctuation in the neighboring pixels, increases the voting wherein the highest weighing is given to the combination with the most votes).

In regard to claims 7, 11, and 14, Kakarala et al., US 2003/0052981, discloses the image processing device and program comprising:

input circuit (see figure 1, element 20) for inputting an digital image wherein one or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system (see para. 29);

first non-existent color component generating circuit (see figure 1, element 40) for making a combination of two or more pixels from a plurality of pixels having the same color component near the pixel of interest within the image signals input from the input means, calculating the average for the combination the color components of two or more pixels for a plurality kinds of combinations in the region near the pixel of interest, and selecting one of the calculated averages so as to generate the non-existent color component (see para. 44);

second non-existent color component generating circuit (see figure 2, element 42 adaptive interpolation logic) calculating parameters (gradients) to be used in a function (see equation 13: function for calculating the interpolated green component at R1) for estimating the color component non-existent in the pixel of interest (Green component at R_1) from one kind of color component obtained in the pixel of interest, near the pixel of interest, using two kinds if color components: the same color component as the color component non-existent in the pixel of interest (Green); and a same color component as the color component obtained in the pixel of interest (Red) (see para. 35, 54, and 83-87), and estimating a color component non-existent in the pixel of interest by said function using the parameters and a color component obtained in the pixel of interest (see para. 62-64 and 88-92: the interpolated green component at R_1 is estimated using the gradients of the neighboring red and blue components),

third non-existent color component generating circuit for calculating the weighted average (I) for the non-existent color component generated by the first

non-existent color generating means and the non-existent color component generated by the second non-existent color component generating circuit, thereby generating the non-existent color component value (see para. 61-64 and 75-76: weighting is applied to the weighted averaged or interpolated value I).

The Kakarala reference does not specifically disclose combining two or more pixels, from a plurality of pixels having the same color component as a color component non-existent in a pixel of interest within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest.

Sasai, US 6,654,492, discloses a an image processing apparatus with an interpolation circuit (see figure 1) for combining two or more pixels, from a plurality of pixels having the same color component as a color component non-existent (Green or Blue) in a pixel of interest (R pixel) within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest (see figure 3A-4C and column 4, lines 10-65: the neighboring blue pixels are averaged and neighboring Green pixels are averaged).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Kakarala et al., US 2003/0052981, in view of Sasai, US 6,654,492, to have the initial, non-existent color component generating processing for combining two or more pixels, from a plurality of pixels having the same

color component as a color component non-existent in a pixel of interest within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest, in order to obtain a high-quality, small-size image at a high speed without requiring a large number of processes or high power consumption.

In regard to claims 8 and 12, Kakarala et al., US 2003/0052981, discloses the image processing device according to claims 7 and 11, respectively, further comprising region judgment means for making judgment whether or not the region near the pixel of interest is a texture region, and also making judgment whether or not the region near the pixel of interest is an edge region, wherein in the event that judgment is made by the region judgment means that the region is a texture region, the evaluation of the reliability is increased, and conversely in the event that judgment is made that the region is an edge region, the evaluation of the reliability is decreased (see para 70).

In regard to claim 15, Kakarala et al., US 2003/0052981, discloses the image processing device according to claim 14, further comprising weighting region setting means for selecting a pixel set for calculating a weight to be used to calculate the weighted average within the region near the pixel of interest (see para. 76: the weighing region or neighborhood are set to size N and the pixels within that distance around the target pixel with the non-existent color component are selected), wherein the third non-existent color component generating means uses a value calculated based upon a statistical amount of pixel values of the pixel set, as a weight (α) to be used to calculate

the weighted average (see para. 75: the weight α is determined within the neighborhood set and is then applied to determine I).

In regard to claim 16, Kakarala et al., US 2003/0052981, discloses the image processing device according to claim 15 wherein the weighting region setting means lies within a region with a predetermined size (N) near the pixel of interest (see para. 76) and comprising a plurality of sub- regions or columns with a size smaller than the predetermined size, and selects a target sub- region from the sub-regions based upon pixel values in the sub-regions, to set a union of pixels contained in the selected sub-region as the pixel set (see para 71 and 72: the region or neighborhood is divided into columns to determine the weighing wherein the columns read on sub-regions).

In regard to claims 17 and 18, Kakarala et al., US 2003/0052981, discloses the image processing device according to claims 15 and 16, wherein the second non-existent color component generating means calculates approximation parameters based upon pixel values of the pixel set selected by the region setting means (see para 54: the gradients or parameters are calculated for each column wherein the column read on sub-regions).

In regard to claims 19 and 20, Kakarala et al., US 2003/0052981, discloses the image processing device according to claim 15, wherein the statistical amount represents uniformity of the pixel values of the pixel set (see para. 75 and 76: the more uniform the pixel set the higher the weighting).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gevell Selby whose telephone number is 571-272-7369. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on 571-272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

gvs

/Lin Ye/
Supervisory Patent Examiner, Art Unit 2622